# SYSTEMIC GONORRHEAL INFECTION.*

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The gonococcus may enter the blood, causing septicemia, and from the blood be deposited in favorable locations, producing inflammatory lesions. The literature on the subject shows that there is hardly a single organ in the body which may not become infected. Power reports a diffuse inflammation of the entire upper extremity due to a mixed infection by gonococci and staphylococci; Mazza a pleuritis, and so on from meningitis to an involvement of the skin on the sole of the foot. Why such entrance of the organism into the blood occurs in one case and not in another is hard to explain. A history of previous instrumentation in many of these cases suggests traumatic lesions of the mucosa as favoring general diffusion. Werthiem has demonstrated invasion of the veins with resulting thrombus, and Dreyer an involvement of the lymphatics.

Septic symptoms coming on in the presence of a gonorrheal urethritis should always be investigated, and it should be remembered that the amount of discharge is no factor. Often with the fever, sweats and depression of the systemic involvement, the discharge diminishes or may be absent. The primary focus may not be in the urethra, but in the prostate, vesicle or Cowper's glands. Systemic infections have been seen in infants with gonorrheal ophthalmia. In these cases a positive cultural test of the blood or joint fluid establishes a diagnosis, but unfortunately gonococci are very difficult to cultivate and a negative finding means nothing. I saw an analysis of a hundred cases in which only four gave a pure culture of the organism; in thirteen the culture was mixed and in eighty-three there was no growth. Although with improved technique we are getting better results in cultivating the gonococci, still a point has not been reached where we can absolutely rely on cultural tests. The blood picture does not differ from a septicemia caused by other organisms, showing as a rule a leucocytosis with an increase of the polymorphonuclear neutrophiles.

The fever associated with the primary disease is not an indication of systemic infection, but is probably due to the absorption of toxins. Often the symptoms suggest typhoid, which is at times difficult to exclude. Several observers have remarked the profuse sweats of gonorrheal septicemia. Thayer, in two of his cases, describes a diffuse eruption of reddish papules on the thorax and abdomen. The leucocytosis and absence of epistaxis and Widal are suggestive.

A case reported by Sherrer is of interest in this connection. A young soldier, who had been feeling out of sorts for a few days, entered the hospital with chills, headache and severe malaise. These symptoms in the next few days were accompanied by dyspnoea, diarrhea and increase of temperature. He gave a history of a slight urethral discharge for two weeks, but his symptoms were ascribed to typhoid. The serum test was repeatedly negative. His condition became rapidly worse, a soft murmur at the mitral area developed and his pulse became dicrotic. Six days after his entrance to the hospital there were further complications; the dyspnoea increased and mucous rales could be heard over both lungs. The following day a left pleural effusion developed, the fluid from which was rich in gonococci. He succumbed on the eighth day and post-mortem examination showed a gonococcic infection of the lungs, heart, pleura, peritoneum and urethra. The virulency of the infection in this case was not manifested before the systemic infection, as the urethral discharge had been very light.

Dieulafoy and others in cases that gave evidence of lung involvement have demonstrated gonococci in the sputum. Thayer demonstrated the organism in eight out of eleven cases of gonorrheal endocarditis. In arthritis gonococci can often be found in the joint fluid. The parts most often complicated in systemic gonorrhea are the heart and the joints.

Gonorrheal endocarditis is quite frequent and is a very serious complication. Some cases have been reported where the course was benign and the patient recovered with a crippled valve, but in most, the inflammation leads to proliferation and ulceration with the tendency to give rise to emboli. The left side of the heart is almost always affected and the aortic orifice is more frequently diseased than the mitral. A peculiarity of the heart sounds in these cases, as stated by several authors, is that they change very frequently in character and cannot be estimated with any degree of accuracy. Thayer reports cases in which the sounds during life suggested mitral involvement, yet at autopsy no lesions were found. Thomas had a case with marked vegetations on the mitral valves which gave no evidence on auscultation during life. Pericarditis has occurred and Councilman reported an acute gonorrheal myocarditis.

Articular involvements are the commonest of all and are disabling and serious complications. Many cases have been found in children with ophthalmia neonatorum. Males are more frequently affected than females and between the ages of twenty and thirty the most ceses occur.

Arthritis usually comes on during the acute urethritis, but may occur during the subacute or chronic stage. In Northrup's cases three or more joints were affected in 175 cases, one joint in 56 cases. Joints that are rarely affected by rheumatism are usually attacked, as the sterno-clavicular, intervertebral, temporo-maxillary and sacro-iliac. The

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inflammation is often periarticular and extends along the sheaths of the tendons; more often the synovial membrane is affected. If fluid accumulates it rarely becomes purulent.

Osler describes several clinical forms.

(a) Arthralgic,—in which there are wandering pains about the joints.

(b) Polyarthritic,—in which several joints become swollen and tender.

(c) Acute gonorrheal arthritis,—in which a single articulation becomes suddenly involved, with severe pain and extensive edema.

(d) Chronic hydrarthrosis,—which is usually monarticular and very apt to involve the knee. It comes on without pain or swelling.

(e) Bursal and synovial form,—which attacks chiefly the tendons, the bursae and periosteum. The bursae of the patella, the olecranon and the tendo Achilles are most apt to be involved.

Gonorrheal exostoses of the os calcis usually occur between the ages of 18 and 30. Traumatism and occupation do not seem to be factors in their production. Some time after the urethral infection, usually from three to nine months, the patient complains of sharp, severe pains in one or both heels. The pain can be sharply localized in the center of the plantar surface of the heel and elicited only by weight bearing or direct pressure. The pain may incapacitate the patient. The gait is characteristic, the weight being borne by the ball of the foot with the heel raised. The os calcis is enlarged and thickened in most cases and the evidence of the radiogram establishes the diagnosis.

The liability of joint affections to recur as long as a focus of infection is present is illustrated by a case I now have under treatment.

Mr. A., age 32, traveling salesman. Always in perfect health until twelve years ago, when he contracted gonorrheal urethritis. This he treated by means of injections without much benefit for four weeks, then the left knee became involved. This was treated with salicylates, liniments, etc., and finally aspirated and was put in a cast. After being in the cast thirty days the pain became so intense on account of the reaccumulation of the fluid, that it had to be removed. After seven months of treatment he could again walk with a somewhat crippled joint. For four years he led a regular life and was free from trouble. Then after intercourse his discharge reappeared and with it an arthritis in the left hip, which lasted three months. Later on he noticed after intercourse a slight urethral secretion at times and has had the left knee, heel, cervical intervertebral and hip joints involved. One month ago he came to me complaining of stiffness in moving the jaw and a urethral discharge. On examination the secretion contained gonococci. A well-marked stricture of about 24 F. was found in the anterior urethra and the prostatic secretion contained many pus cells. He has developed arthritis of both tempora maxillary joints, as well as in the left knee and the metatarsal phalangeal joint of the great toe.

As all previous methods of treatment have been so unsatisfactory, we naturally turn to vaccine therapy as a panacea in these conditions. Although many good results have been obtained, still at times we are disappointed. Whether this is due to a worthless vaccine, a mixed infection or the attendant is often hard to determine. There is no doubt that autogenous vaccines are more effective than stock vaccines, but they are often impossible to obtain.

Drs. Eyre and Stewart, who have done a great deal of work with vaccines, claim that the doses generally used are too large and advocate the use of doses not to exceed 25 millions. In systemic infections a dose of 5 millions is given every five days. Where there is a joint involvement, in twelve to twenty-four hours after an injection, the affected joint becomes more painful and sometimes more swollen and red. These symptoms correspond to the negative phase. After 36 to 48 hours these symptoms clear up and the movements become much freer. A vaccine that can be used in large doses with no effect should be regarded with suspicion and the possibility of a mixed infection should not be overlooked. The use of hot air and passive hyperemia in joint conditions is an aid. The original focus should always receive attention.

## ON THE RELIEF OF GLAUCOMA BY SUBCONJUNCTIVAL SODIUM CITRATE INJECTIONS.

By HAYWARD G. THOMAS, M. D., Oakland.

Pathologists and clinicians are agreed that glaucoma represents in essence a state in which the eye holds an increased amount of water. As we had best now regard it, it is in reality an edema, and the increased pressure brought about by this means accounts for all the clinical signs and symptoms observed in the condition. As generally held the increased amount of fluid contained in the eye in glaucoma is believed to be forced into the eye through such agencies as an increased influx or a diminished efflux of blood and lymph from the eye. The unsatisfactory nature of this idea is expressed in every text book of ophthalmology. Martin H. Fischer, in his work on edema, has given another interpretation of the phenomena observed. He maintains that the eye comes to hold an increased amount of water in glaucoma, not because more fluid is *forced* into the eye, but because changes take place within it which make it absorb more water than normal. He holds that the colloids determine the amount of water held by any tissue and defines glaucoma as a condition in which the normal affinity of the ocular colloids for water has been increased. This increase in the affinity of the colloids of the eye for water is brought about in either one or both of the following ways: First, through the production of acids within the eye; or second, through such changes in the colloids themselves as convert those having a low affinity for water into such as have a greater affinity. The necessary conditions for such an abnormal production of acids or such a change in the colloids of the eye are to be found in those illy grouped factors of arterio-sclerosis, syphilis, old age, primary inflammatory conditions, etc., that are generally looked upon as primarily responsible for glaucoma.

The clinical methods that we pursue in order to treat glaucoma divide themselves into the two groups of a systemic treatment which would combat an arterio-sclerosis, a syphilis, or what not, and a local treatment which in the aggregate is aimed at the mere reduction of tension within the eye. Upon this